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RESEARCH ON BLOSSOM DROP

/Following is a translation of an extract from an article by E. Hannig originally entitled "Research on Blossom Drop, Etc." as published in the German-language periodical Zeitschr. Botanik (Botanical Journal), No 5, 1913, pages 456-469./

A SUMMARY OF RESULTS

1. A limited number of plants have the characteristic of casting off blossoms, buds, and fruit, eventually even leaves and internodes in air which is contaminated with traces of coal gas.

2. This characteristic appears, if at all, to develop in the case of all species of a genus, but it does not occur, however, in all genera of a family of plants.

3. The dropping of blossoms, fruit, and buds ("blossom drop") in the laboratory environment occurs only in the plants whose flower stalk possesses a characteristic divisional structure ("primary level of division").

4. This divisional structure can lie either at the apical or basal end or approximately in the middle of the flower stalk.

5. Those plants whose flower stalks possess a primary level of division also exhibit the same tendency on the leaf stems, or perhaps at the bases of the internodes.

6. The divisional structure is formed either by especially small, isodiametrically active cells, or by a structure similar to a meristem tissue.

7. The dropping results from a dissolving procedure in a narrow zone of this divisional structure, the dissolution layer. This dissolving process leads in a majority

of cases of the plants under consideration to a dissolving of the mid-lamella and, in the case of mirabalis and oxybaphus, to a dissolving of the entire cell membrane and the destruction of the contiguous protoplasm.

8. The character of the divisional structure and the type of dissolving process can be compared in the leaf stems, or at least in the internodes, with the flower stems of the contiguous plants.

9. The dissolution of an entire cell layer in the case of the dropping of a leaf presents a new type of leaf drop.

10. Vestigial traces of coal gas or tobacco smoke in greater concentrations are among the chemical factors accounting for triggering the blossom drop. CO_2 does not affect the blossom drop.

11. An earlier blossom drop occurs at a gradual or sudden rise in temperature. Increasing the temperature also causes blossom drop in the laboratory environment.

12. In androgynous plants the still distended male blossoms fall a few days after pollination, while unfertilized female or hermaphroditic blossoms are caused to drop while still blossoming.

13. Drop is accelerated in unfertilized blossoms by removal of the crown leaves or stamens, and even more by removing the stigma or the seed-bud. Fertilized blossoms also drop quickly after the excision of the seed-bud.

14. Truncation of the axil, i.e. diagonal cutting of the flower stalk or leaf stem, or, alternatively, of an internode, results in the drop of the stalk.

15. Wounding as such does not come into consideration here, since after an extensive wounding no dropping of the blossoms, leaves, or internodes will take place as long as a sufficient number of capillaries remain intact.

16. Dropping of buds, blossoms, and fruit under the influence of the laboratory environment extends over a very long period of time, without any reference to the age of the blossom. This occurs in the first hours only to isolated blossoms, etc., until blossom fall increases rapidly up to a certain point. This point can be considered as the beginning of the primary reaction and can be utilized in a

way for measuring reaction time.

17. This reaction time does not only vacillate according to the conditions at the time of the experiment, but also according to the atmospheric conditions at the time of the experiment as well as according to the developmental stage of the plants.

18. After effects of the coal gas or of the tobacco smoke (i.e. time of exposure, intermittent stimulus, etc.) cannot be examined, since it cannot be stated how long the effective gas still remains in the intercellular structure or in the cells of the plant after the removal of the plant from the polluted air.

19. The drop of the still forming blossom is to be considered a stimulus reaction and should be added to the chorism process discovered by Fitting.

20. An auto-chorism is certainly present in the natural detachment of purely male pollinated blossoms, and an aitiochorism in the dismemberment of internode stalks and those pollinated blossoms whose stalks do not become detached of themselves after fruit sets. In the remaining cases it cannot be determined with certitude whether or not the stimulus reaction is an accelerated autochorism or a specific chorism which has been induced.

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